

Oil and Gas Systems

Methane emissions occur during normal operation, routine maintenance, and system disruptions in the oil and natural gas industry. Emissions vary among facilities and are largely a function of process and equipment type, operation and maintenance procedures, and equipment conditions. Although natural gas is a relatively clean source of energy, methane losses from oil and gas systems account for more than 20 percent of total worldwide methane emissions.

GMI's Oil and Gas sector has undertaken numerous activities to support the identification, reduction, and

recovery of vented and fugitive methane emissions from oil and natural gas systems in Partner Countries. Through capacity-building workshops and trainings, prefeasibility and onsite measurement studies, and the development of critical tools and resources, the sector works to reduce the informational, institutional, and financial barriers to emission reduction technologies and practices.

The United States encourages GMI Partner Countries to implement proven, cost-effective technologies and practices that can minimize methane losses.

Conducting Measurement Studies With Gas Authority of India Limited

The Gas Authority of India Limited (GAIL) is a state-owned natural gas processing and distribution company with headquarters in New Delhi. GAIL, which was incorporated in August 1984, was initially given the responsibility of constructing, operating, and maintaining a large pipeline project that served as a cornerstone for India's natural gas market. GAIL has since grown by building core pipeline assets, processing plants, and a gas-based petrochemical business. GAIL joined the Natural Gas STAR International Program in August 2011, and has been working collaboratively with EPA as well as Natural Gas STAR International partner Oil and Natural Gas Corporation (ONGC).

EPA conducted a two-week measurement study at GAIL's Vijaipur facility. This field work builds on the desktop study of GAIL's Vijaipur facility, which was completed in May 2011. The measurement study not only sought to establish the actual emission estimate, but also showcased the advantages of conducting leak inspections using the forward-looking infrared (FLIR) camera. As part of the



Leak measurement using a Hi Flow® Sampler at GAIL's Vijaipur facility study, leaks were measured using a Hi-Flow Sampler, a turbine meter, or an acoustic leak detection device. A significant study outcome involved making actual measurements for the seal oil degassing vents using a turbine meter.

Undertaking Field Measurement Studies and Training Workshops in Mexico

Global Gas Flaring Reduction Workshop

In May 2011, the World Bank's Global Gas Flaring Reduction (GGFR) Partnership and EPA organized a joint workshop addressing flaring, venting, and fugitive emissions in PEMEX installations. The specific workshop objective was to build capabilities in support of PEMEX's Strategic Flare/Vent/Fugitives Measurement Plan within the newly formed Grupos de Medición. GGFR and GMI experts provided a detailed overview of current best practices on measuring gas flare, vent, and fugitive volumes; outlined key constraints and considerations when selecting flare measurement systems for both new and existing flaring installations; discussed practical metering experiences and challenges faced by operators; and provided other lessons learned from their experience in monitoring, verification, and regulatory supervision. The workshop targeted staff from PEMEX as well as Mexico's Energy Secretariat and National Hydrocarbon Commission. EPA presentations provided overviews of GMI, the Natural Gas STAR Program, and EPA's GHG

Reporting Program, as well as results of the training and measurement study work with PEMEX.

Measurement Study and Training

In late 2011, GMI, GGFR, and PEMEX collaborated to organize a four-day methane emission measurement study combined with a one-day training session for 35 people from PEMEX Exploration and Production in Poza Rica. The classroom training session provided a broad overview of the technologies for methane emissions detection, quantification, and control. It also covered more strategic topics associated with planning, execution, implementation, and follow-up of measurement studies. Over four days, the trainees participated in a measurement study of five installations, with training on equipment use, measurement study activities, and information recording for a variety of methane emissions sources. In addition to methane venting and leak measurements, the study also included GGFR Partnership-supported measurement and analysis of soot formation in flare burners.

Touring Facilities in Texas and New Mexico

Representatives of ONGC (India), Gazprom (Russia), and ENAP Sipetrol (Argentina) joined their U.S. Partner companies to tour operational facilities and exchange ideas for accelerating implementation of projects that capture and use methane. Three U.S. Natural Gas STAR partners—Chevron, Oxy, and ConocoPhillips—hosted the first-of-its-kind study tour, which covered facilities over an expanse of more than 1,100 miles in a 10-day period.

The West Texas and New Mexico sites showcased specific methane emission reduction projects, including vapor recovery units (VRUs), plunger lifts, and reduced emission completions. Participants discussed these projects with the hosts and collected information to help them evaluate project applicability at their own facilities.

Study tour highlights included discussing the causes of reciprocating rod packing emissions and potential solutions, studying techniques for using infrared cameras, visiting manufacturing facilities to view various types

of VRUs and emission inspection/quantification tools, and exploring methane emission capture and control methods with equipment experts. During the tour, ONGC's carbon management team also presented on its GMI activities and emission reduction projects, including tank VRU rehabilitation, servo gas system replacement with instrument air, and vapor recovery using an ejector system.



Study tour participants and a ConocoPhillips representative near a well completion site

Oil and Gas Workshops Around the World

Colombia

EPA hosted a technical training workshop in August 2011, teaming with the Centro de Tecnología de Gas de Colombia, a research organization that provides technical assistance to Colombian natural gas transmission and distribution companies. The training focused on the major sources of methane emissions from gas transmission and distribution, as well as the tools and techniques needed to carry out a methane emissions measurement study.

Indonesia

EPA's Natural Gas STAR International Program attended the Society of Petroleum Engineers' 2011 Asia Pacific Oil & Gas Conference and Exhibition in Jakarta. The event focused on business and technology innovation to ensure sustainable energy. Immediately following the conference, EPA held its first-ever GMI Asia-Pacific Technical Workshop for the Oil and Gas Sector, which was attended by industry executives and other interested parties, with a main goal of sharing GMI and Natural Gas STAR Partner experiences and exchanging technical information on minimizing methane losses.

EPA also participated in the 2011 Pacific Energy Summit, again held in Jakarta, which brought together more than 100 participants from government sectors and oil and natural gas companies. The summit allowed EPA representatives to participate in the dialogue surrounding the environmental considerations important to the development and use of natural gas in Southeast Asia and the southern Pacific. The summit focused on several issues related to natural gas development and use in the region, including: natural gas as an energy source for transitioning to a low-carbon economy; growing role of natural gas to meet rising energy demand; fiscal, regulatory, and legal steps to ensure adequate natural gas supplies; and current and projected domestic natural gas markets.

Russia

EPA supported and participated in an Environmental Defense Fund workshop on methane emissions control in the Russian gas sector, held in Moscow in December 2011. Attendees represented a diverse group of stakeholders, including UNFCCC Joint Implementation project developers with investment portfolios concentrated on the gas industry. The presentations were informative and prompted lively discussion on a variety of topics, including: climate policy and the role of the natural gas sector both in Russia and globally, international climate negotiations, and technological solutions to methane emission control in the natural gas industry.

Ukraine

More than 45 transmission and distribution sector representatives attended a two-day workshop led by EPA and Pacific Northwest National Laboratory in June 2011. The workshop, which took place in Cherkassy, brought together participants from laboratories in all of Ukraine's natural gas transmission and distribution systems. The goal of the workshop was to share best practices and build capacity for methane detection, monitoring, and measurement technologies and practices. This was the first in a series of trainings for staff members who are responsible for leak detection and measurement activities at Ukrtransgaz.